

What is claimed is:

1. A hydrodynamic bearing system, comprising:
a shaft having an axial bore;
a fixing element having at least partially spherical surface;
at least one radial bearing rotatably supporting said shaft;
at least one annular thrust plate fixedly mounted on said shaft; and
a counter bearing corresponding to said thrust plate,
wherein said axial bore is provided in an area of said thrust plate, and wherein said fixing element is pressed into said axial bore in such a way that said spherical surface of said fixing element projects slightly from an end of said shaft and rests on said counter bearing at least during a standstill phase.
2. The hydrodynamic bearing system according to claim 1, wherein said fixing element is a sphere.
3. The hydrodynamic bearing system according to claim 1, wherein said fixing element is a cylinder having a spherical surface at an end facing said counter bearing.
4. The hydrodynamic bearing system according to claim 1, wherein said fixing element projects from the end of said shaft by a defined distance, said distance being chosen in such a way that when a critical speed is reached, said fixing element lifts away from said counter bearing and no longer touches it.

5. The hydrodynamic bearing system according to claim 1, wherein said thrust plate is arranged in a sliding fit, a transition fit or by means of a press fit on said shaft.
6. The hydrodynamic bearing system according to claim 1, wherein an outer diameter of said fixing element is greater than an inner diameter of said axial bore, and wherein said thrust plate is fixed to said shaft by pressure generated when said fixing element is pressed into said shaft.
7. The hydrodynamic bearing system according to claim 1, wherein said thrust plate is arranged in a sliding fit, a transition fit or by means of a press fit on said shaft and is fixed to said shaft through the insertion of said fixing element into said axial bore.